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From the Top

Asset Management

Over the past few months, we've initiated one of the most significant paradigm shifts in civil engineering's recent history by starting our transition to an asset management culture. Initially, the most visible changes will be to the organizational chart, but these just mark the beginning of our long journey to revolutionize how we manage our installations and infrastructure.

Asset management can be defined as using systematic and integrated processes to manage natural and built assets and their associated performance, risk, and expenditures over their life cycles to support missions and organizational goals. Asset managers will be expected to apply a disciplined, deliberate approach to managing our asset portfolio in a more holistic and proactive manner than we've done in the past. Asset managers will provide strategic direction by asking several important questions: What assets do we need? What assets do we have? What's the resulting capability gap? And finally, what are the options to optimize these assets? Asset managers may not "own" all the associated processes to answer these questions, but they'll be able to integrate the information across the functional spectrum to ensure a comprehensive strategy to fully utilize, optimize, and leverage Air Force assets.

We've also widened the aperture in defining an "asset," no longer restricting it to traditional "brick and mortar" infrastructure such as real property and housing. Now the term also includes our environmental and energy resources, all of which have some level of intrinsic worth that should be harnessed. Enhanced-use leasing, trading air credits, and even selling energy back to utility companies are a few examples of largely untapped value. To fully unleash the synergistic potential of our total Air Force portfolio, we're moving toward a more widespread strategy of centralizing or "bundling" purchases of both goods and services, and standardizing our core processes and service standards where feasible.

Without exception, corporations, cities, and federal agencies who have adopted asset management capabilities have significantly reduced their costs and dramatically improved their effectiveness and efficiency. But these successes were not realized overnight. Our transformation to a fully realized asset management culture will be a marathon, spanning months if not years, so we'll start with small victories and continue with a bridging strategy to get us where we ultimately need to be. We have tough work ahead of us — creating and reengineering our processes, and developing asset management tools such as a robust training program and a powerful IT system. But we are stepping out quickly with the focused goal of enhancing our support to the warfighter by returning dollars to the mission while efficiently providing required infrastructure and delivering on our promise to take care of our Airmen. I'm sure asset management will present some challenges, yet I'm equally confident it will create new opportunities for our bases as well as the men and women who work so hard every day in supporting those bases. I have no doubt that our Air Force civil engineers have the talent and drive to make asset management a complete success. Thank you all for serving.

Del Eulberg
Major General, USAF
The Air Force Civil Engineer

Air Force Civil Engineer

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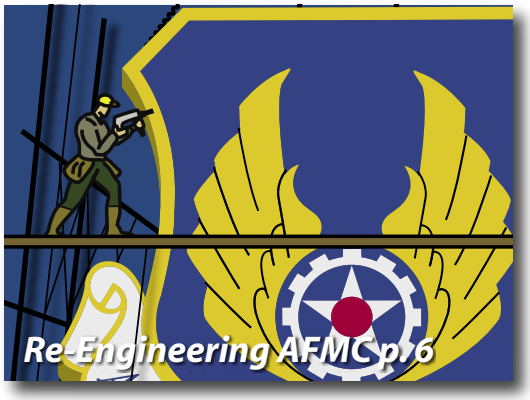

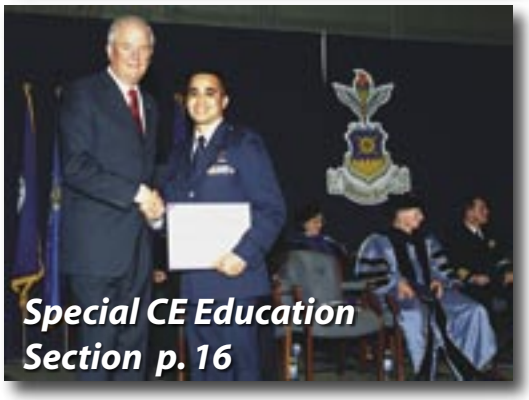

Back cover: U.S. Air Force Airmen with the 8th Civil Engineer Squadron's airfield damage repair team install anchors in a mobile aircraft arresting system during an operational readiness inspection at Kunsan AB, South Korea. (photo by MSgt Jack Braden; treatment by Mr. Guy Ivie)

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On the cover: U.S. Air Force Academy Cadets Reid Touchberry, Caitlin Holliday, and Lauren Robillard check the set-up prior to conducting a California Bearing Ratio test during a pavements laboratory. (photo by Ms. Meggen Burghardt)

Command Focus Air Force Materiel Command

Ms. Teresa Hood
Editor

"We're changing—not just becoming a smaller Air Force, but a different Air Force," said Mr. Tim Bridges, Air Force Materiel Command's Director of Installations and Mission Support. Nowhere are these changes more evident than in HQ AFMC's Civil Engineering Directorate.

HQ AFMC/A7C is not alone; civil engineering directorates at all the major commands are realigning based on Program Budget Decision 720 and Air Force Transformation requirements. But HQ AFMC/A7C has been given an additional piece of the reconstruction job: they are directly involved in one of the five key Transformation initiatives for Air Force civil engineering. Almost all the military positions will be eliminated from civil engineer groups at three AFMC bases—Eglin in Florida, Hill in Utah, and Robins in Georgia. In turn, the bases' civil engineer groups will gain some civilian authorizations, primarily from other MAJCOMs and a smaller number from within AFMC.

"We made a corporate decision to draw down the military in this command to 'pay the bill' for civil engineering's drawdown," said Mr. Bridges. "There are some good reasons why this makes sense and we've already started the process [See "Re-Engineering AFMC," p. 6]. It's a huge challenge, but if anyone was going to be able to do this, or had the experience, it was us. We have the most diversity; we go from organic, full-up military organizations all the way to contracted-out organizations."

AFMC's diversity springs from other sources, as well. They are the "acquisition" command, with the responsibility to develop, acquire, test, and sustain the Air Force's weapons systems — a mission that comes with some unique facilities and responsibilities. "We have all the same mission support requirements as the other commands," said Mr. Bridges, "but we also have larger, more industrial-type facilities, depots, laboratories, assembly lines, plants, and government-owned/contractor-operated facilities."

AFMC's organizational structure is a little different, too. On AFMC bases with centers, the installation's senior official is the commander of the center rather than the wing. Civil engineer units in AFMC's wings are typically large enough to be groups. Many of the centers and other special facilities generate working capital from their customers, and HQ AFMC's CEs must keep the different funding streams and their requirements straight.

So how will AFMC's altered CE workforce—smaller, with fewer military and more civilians—manage all the changes coming to their large, diverse command? "By evaluating all of our processes," said Mr. Bridges. "We've got to prioritize better; we can do anything, but we can't do everything. We need to be efficient and flexible, and find better ways to apply our limited resources."

Real estate is one of the strategic areas AFMC's CEs are focusing on, both to reduce their footprint and to get more value for what they have. "We worked with the Air Force Real Property Agency and Kirtland AFB in New Mexico to 'birth' the enhanced-use lease process within the Air Force," said Mr. David Bek, chief of AFMC/A7C's Engineering Division. "We have other EULs in the works at Kirtland and at some of our other bases; one at Hill in Utah is for about 550 acres. EULs let our bases lease some of their high-value, but under-utilized, assets to developers or other agencies, and use some or all of the 'proceeds' as they wish. Bases could be given actual dollars, or credits that can be used to build additional facilities or renovate existing ones. It's a great way to get additional funds for our bases."

AFMC's MILCON process has been efficient for quite some time. For the past three years, AFMC has taken home one of the Air Force's Dirtkicker Awards—this year for the most improved MILCON program over a five-year period. With only one exception, all of AFMC's MILCON projects in the last 10 years—including congressional inserts—have been awarded in the year of appropriation. "We use design-build methodology exclusively," said Mr. Bek. "It streamlines the preparation time, gives us incredible flexibility during the acquisition cycle, and gives the contractor 'one-shop' responsibility. We typically manage $100–$150 million per year in projects — anywhere from 12 to 15 projects — with a very small staff; we've become very efficient at it."

AFMC CEs have also become pretty efficient at conserving energy. "We're a big part of the Air Force infrastructure and use a lot of energy," said Lt Col Joseph Castro, AFMC/A7C's Operations Division Chief. "We've exceeded the 2005 Energy Policy Act's goals in both energy reduction and percentage of renewable energy. The latest executive order makes the goals more aggressive, so we're now looking at our programs again. We're going to take a systematic approach to it; the first part is a strategic energy plan at every one of our bases, which should be done in the next two to three months, with resource efficiency managers at each base to implement the plan."

The large and diverse facilities at AFMC bases create some substantial environmental challenges, but the command's CEs have developed some very effective — and award-winning — processes for handling them. In 2006, AFMC won four of the eight Air Force environmental awards. "Historically, when the Air Force wins a DoD-level award, half the time, AFMC is that winner," said Mr. Jeff Mundey, chief of the Environmental Division at HQ AFMC. Under a civil engineering Transformation initiative, the environmental remediation program at AFMC — and the other commands — is moving to the Air Force Center for Engineering and the Environment, or AFCEE. "We're turning over a program that's 93% there," said Mr. Mundey. "We have 2,131 sites and in the last 20 years we've cleaned up almost 2,000 of them — a tremendous achievement considering our industrial-type operations. We've been very aggressive with our other programs as well, and will continue to be."

The command's compliance program is huge, with over 19,000 compliance sites, yet in every year but one since 1998, the number of enforcement actions they've received is a single digit. AFMC's pollution-prevention program is likewise very successful. Since 1992, when they generated over 12,000 tons of hazardous waste and air emissions, AFMC has reduced hazardous waste by 53% and air emissions by 40%. "Currently, we're being very proactive and, where we can, we help 'design out' hazardous waste when we build new weapon systems," said Mr. Mundey. "It's a much more efficient way to handle it."

"Again, we can do anything, but we can't do everything," said Mr. Bridges. "We're definitely looking at the answer to 'what can we not do anymore?' But I have absolute faith in our people — they're very flexible and adaptive. You give them a challenge and they always figure it out. Always."

Mr. Timothy K. Bridges became the Director of Installations and Mission Support for Headquarters Air Force Materiel Command, Wright-Patterson AFB, Ohio, in July 2006. He was previously the Deputy Command Civil Engineer and the Command Civil Engineer for HQ AFMC. Mr. Bridges graduated from the Virginia Military Institute with a B.S. in civil engineering. Commissioned in 1979, Mr. Bridges held a variety of positions at the base, major command, and air staff levels before retiring from active duty in the rank of colonel in 2006. He currently oversees all aspects of civil engineering, base support, antiterrorism, and force protection for 78,000 military and civilian employees at AFMC's 10 main bases and 12 specialized centers and units.

Re-Engineering AFMC

Ms. Teresa Hood
Editor

Change management is such an important concept that Harvard offers courses in it, books have been written about it, and journals are dedicated to it. Civil engineers at Air Force Materiel Command are learning to take it just as seriously.

The Transformation plan for Air Force civil engineers includes five critical initiatives to enhance their wartime capability and operational efficiency. All the major commands are dealing with four of them; the fifth is just for AFMC.

Under this initiative, the CE groups at three AFMC bases—Eglin, Hill, and Robins—will be re-engineered, becoming civilianized like the groups at the command's other bases. A total of about 650 military positions will be eliminated. (This number doesn't include firefighter positions eliminated under another of the initiatives.) To offset the reduction in military CEs, the groups will gain some civilian positions from other MAJCOMs or within AFMC.

"When the reductions began to roll in, we had to make a decision," said Mr. Tim Bridges, Director of Installations and Mission Support at HQ AFMC. "We could decrement all the squadrons and have less robust capability, or we could consolidate, taking some down to make sure the remaining ones stayed really good, strong squadrons. The military positions at Robins, Hill, and Eglin are being used to pay CE's functional drawdown 'bill.'"

The three CE groups will still have some military positions. "We will still have the second largest [explosive ordnance disposal] capability," said Lt Col Joseph Castro, AFMC's Operations Division Chief. "Eglin will still have a partial military fire protection flight, and some of the bases will have a readiness flight."

"Academically, it makes sense," said Mr. Bridges. "Most of our activities are in the CONUS. We really don't have warfighting platforms; we take care of everyone else's platforms. The support we give our installations can be done by a civilian workforce. And we've done it before, at Wright-Patterson and our other bases. What doesn't make sense is to have a whole lot of 'broken' squadrons across the Air Force and having even longer dwell times for our engineers. So we've pretty much come to agreement on where we're going to go with our more civilian organization; now we just have to work the transition."

Managing the change day-to-day are Lt Col Alan Wieder, AFMC's Base Support Branch Chief, and CMSgt James Martin, AFMC's Civil Engineer Functional Manager. Together they oversee the re-engineering at the macro- and micro-levels, with both the groups' organization and with the individual CEs affected by the change. One of the most important things they manage is information.

"The word about the breadth of PBD 720 doesn't seem to be out there," said Lt Col Wieder. "Some people think it's only about their base or their group. So we're visiting the bases; we've been to Eglin, Robins, and Hill."

"They only have bits and pieces of the whole 720 and don't always see the broad, overall picture," agreed CMSgt Martin. "Through the conversations we've had with leadership, enlisted and officer, we've talked to them and said, 'Yes, it's about you, but it's also much bigger than you. It's much bigger than just this command.'"

"There are a lot of unanswered questions for the young troops," said Lt Col Wieder. "A lot of Chief Martin's efforts have been in getting some predictability for our young Airmen."

"It's been a bit of an arduous task, but we're there," said CMSgt Martin. "I have a spreadsheet that identifies each individual by name — all 650 plus folks — and when they can leave, when the position is being cut. This gives the unit some predictability of when members depart so the units can sustain mission capability during the transition. It also gives the Airmen and their families some predictability as to when they are sub-

ject to leave, so they know when to sell the house, when the spouses can quit their jobs, etc. It's important that we alleviate as much stress as we can during these trying times."

"A lot of it is also for the organizations, to track the military knowledge base and make sure it can get transferred to a new civilian with no loss of continuity or service," said Lt Col Wieder. "Long-term civilians should provide a core of knowledge in most shops, but we're building in some overlap. It will be a two-year process at least; Eglin won't lose all their military until 2009 because of BRAC changes and other variables."

At the same time, the three groups will undergo an organizational restructuring under the Transformation initiative. "The three groups are basing their structure on the Air Force model, but they were all given some latitude in how they will be organized, and each is slightly different because of their different needs," said Lt Col Wieder.

So what's the hardest part of their jobs? "Mine is all about the faces," said CMSgt Martin. "To let the Airmen know that they're still vital members of the Air Force and we have a place for them. All we are asking them to do is PCS and do the outstanding things they do at another location. Some may not get the assignment they want, some will. I have to ask, 'How has that changed from before?'"

For Lt Col Wieder "it's the overall resistance to change. The battle of 'this is the way we've always done it.'"

AFMC began managing the change by creating a CE re-engineering integrated process team that included its deputy base civil engineers. In a three-day meeting, they looked at core engineering processes and discussed lessons learned from previous conversions to civilian workforces within AFMC, from A76 or direct actions.

"I think it was important for leaders at the three groups to hear from others who have already dealt with this," said Lt Col Wieder. "How are they going to function with fewer bodies? One of the things that came out was they'll have to stop doing the favors, the things they're not manned for; it's managing expectations from the bases."

"We have to get more lean, more efficient," said CMSgt Martin.

"With this re-engineering they can decide what they can or won't do any longer," said Lt Col Wieder. "They have a clean slate."

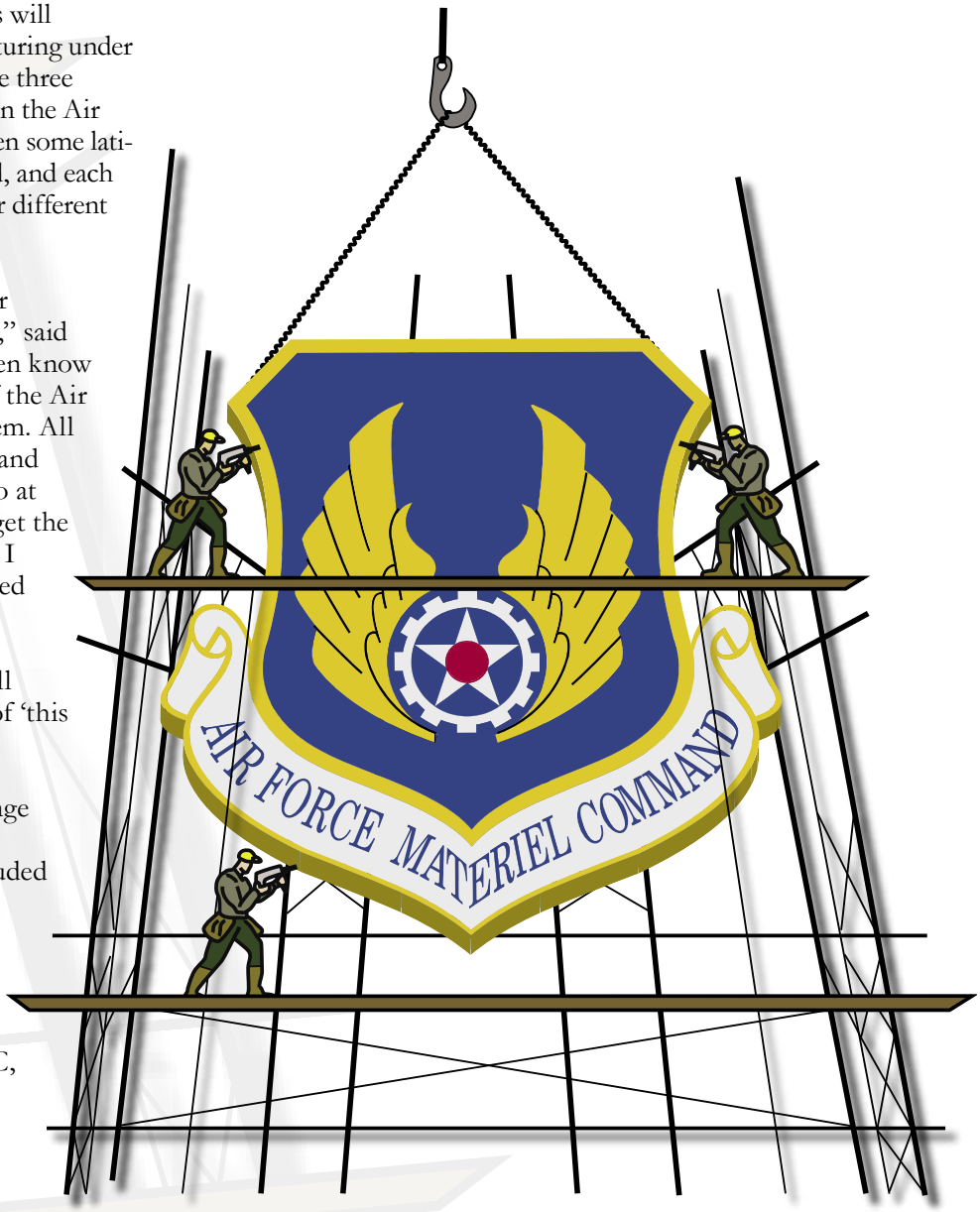


Illustration by Mr. Juan Villegas

EOD Airmen Sacrifice and Make a Difference

Maj Gen Del Eulberg
The Air Force Civil Engineer

U.S. troops and coalition members are facing an escalating threat from improvised explosive devices. The devices, commonly called IEDs or roadside bombs, continue to plague U.S. military operations in Iraq. IEDs are also becoming more common in Afghanistan. During the first two years of the war, IEDs accounted for just over 20% of all U.S. fatalities. According to the Brookings Institute, that percentage has risen to over 50% this past year. IEDs also account for half of all U.S. troop injuries in Iraq.

The use of roadside bombs is essentially the same tactic Lawrence of Arabia used against the Turks during the Arab Revolt of 1916-1918. In his memoir, "Seven Pillars of Wisdom," published in 1922, T.E. Lawrence, the British army officer who helped lead the Arab Revolt, wrote that his use of roadside bombs made traveling "an uncertain terror for the enemy." Lawrence and his men targeted trains. Today, hidden explosives are being used by insurgents to target the U.S. military's Humvees and other vehicles.

...about 50% of all attacks against U.S. and coalition forces were from IEDs in 2005. By late 2006, that number surged to about 75%.

According to the Joint IED Defeat Organization, or JIEDDO, the agency set up by the Department of Defense to fight the problem, about 50% of all attacks against U.S. and coalition forces were from IEDs in 2005. By late 2006, that number surged to about 75%. IEDs are the insurgents' weapon of choice for two reasons: they are effective tactically and strategically, and they allow the insurgents to attack U.S. forces with minimal risk to themselves. The Pentagon has spent billions of dollars on "up-armoring" vehicles to protect personnel and deploying various technologies, including electronic jammers, to prevent detonation of IEDs.

Progress is being made by the services and JIEDDO in protecting personnel and resources from the harmful effects of IEDs. Though IED emplacements continue to rise, electronic warfare techniques, advanced armored vehicles, and personal protective equipment ensure fewer casualties per IED attack. JIEDDO notes that the "vast majority" of IEDs are disarmed, jammed, or otherwise rendered harmless. However, despite billions of dollars being spent on counter-IED technologies, the single most important element remains our explosive ordnance disposal Soldiers, Marines, Sailors, and Airmen on the ground who personally meet the challenge.

The majority of joint EOD forces in the U.S. Central Command are aligned under Combined Joint Task Force Troy in Iraq, and CJTF Paladin in Afghanistan. The Marine Corps is responsible for Multi-National Forces-Iraq, West in the Anbar Province of Iraq. The CJTF teams and lower-echelon battalion-level staffs comprise Soldiers, Sailors, and Airmen, with command and control positions being filled from the Army and Navy because of the Air Force's structural lack of C2 capability.

Requests for EOD forces continue to flow; the current requirement will grow from 227 to 254 personnel by November 2007, including 30 Airmen postured outside Iraq and Afghanistan. In May 2006, the U.S. Air Force Chief of Staff approved posturing EOD personnel as enablers, aligning everyone in three groups: red, white, and blue. The normal Air Expeditionary Force structure was no longer working (the AEF Center consistently had to reach forward or back to fill increasing requirements). This pushed Air Force EOD technicians to minimum tours of 179 days but also improved deployment predictability. Due to the shortage of officers and staff noncommissioned officers, these Airmen are individually tracked and deployed based on

their last return date. During May 2006, the Air Force Manpower, Organization, and Resources office identified EOD as one of four Air Force Specialty Codes on the Secretary of Defense's critical skills list.

By November 2007, Air Force EOD will have 157 Airmen in Iraq (approximately 34% of joint EOD forces on the ground in Iraq), located at Baghdad International Airport, Balad, Kirkuk, Ali, and at 11 Army forward operating bases, and will also provide coverage of the greater Baghdad region in support of Multi-National Corps-Iraq. These forces are critical to the joint counter-IED mission. We have EOD leadership positions on CJTF Troy, providing NCO leadership on 18 weapons intelligence teams and an officer on a WIT C2 element. WITs are located throughout Iraq performing 365-day extended deployments.

In November, 67 Airmen — constituting 19 of 32 (61%) joint EOD operational teams — will be on the ground in Afghanistan at Kandahar and Bagram and at 11 Army forward operating locations. We have leadership positions on CJTF Paladin and Army battalion-level staff in Bagram. We also have two NCOs on 365-day extended deployment supporting two provisional reconstruction teams in Afghanistan. This totals to 60 Air Force-specific requirements and 194 joint requirements in Iraq and Afghanistan by November 2007.

EOD Airmen provide agile combat support to the combatant commander. Air Force EOD operations "outside the secured perimeter" are essential to air base force protection and the freedom of operation of land-maneuver forces. EOD Airmen are making a difference and saving lives for

(left) SSgt Andrew Smith, 447th AEG, commands a detonation of explosives on a range adjacent to Baghdad International Airport, Iraq. (photo by SSgt Bryan Bouchard) *(below) SrA Sabrina Baker, 455th ECES EOD Flight, helps clear a path through a minefield near Bagram Airfield.* (photo by SSgt Marcus McDonald)

SSgt Edward Lockhart (left) and SrA Nick Last remove rocket propellant for disposal. Both Airmen are explosive ordnance disposal technicians with the 386th EOD team at a forward-deployed location. (photo by SSgt Karen J. Tomasik)

members of all services. In calendar year 2006, Air Force EOD warriors conducted 45% of the joint-service missions in CENTCOM, responding to 8,319 incidents involving explosive hazards; 3,456 of these incidents involved face-to-face contact with IEDs of all types.

This success has not come without tragic losses. Since March 29, 2006, six EOD Airmen—Capt Kermit O. Evans, MSgt Brad A. Clemmons, TSgt Walter Moss, TSgt Timothy Weiner, SrA Elizabeth Loncki, and SrA Daniel Miller—have paid the ultimate price. Four more returned with serious wounds—MSgt Bill Ewing, SSgt Chris Ramakka, SSgt Matt Patnaude, and SrA Dan Acosta. Many others have been wounded, but were able to return to duty.

Because of increased CENTCOM requirements for this high-demand AFSC and declining retention rates, our officers and SNCOs have now reached the critical 1:1 deployment to dwell ratio. This 1:1 dwell equates to being deployed for six months, returning home, and entering pre-deployment training approximately four months later to start the entire cycle all over again. The stress from increased deployments has a negative effect on the health of our entire EOD force, not just the officers and SNCOs. The shortage of enlisted leadership at base level impacts the ability to mentor and train our junior enlisted force, as well as provide critical leadership during theater operations. When not deployed, EOD Airmen are "task saturated," performing numerous missions such as range support, force protection, aircraft response, and joint POW/MIA recovery, as well as an increasing number of VIP protective support missions. During 2006, EOD Airmen supported the U.S. Secret Service protecting the commander in chief on a total of 857 missions, expending 160,000 man-hours in the process.

Due to my rising concern over the future health of this critical warfighting AFSC and the men and women who execute the mission, I directed a top-to-bottom review of manning requirements and the formation of an EOD Optimization Integrated Process Team to determine proper flight structure to sustain the current level of operations while maintaining technical proficiency. The IPT also focused on development of a C2 capability to fulfill air operations center and JTF requirements and on the redistribution of manpower to effectively and efficiently meet

Air Force EOD technicians use the Talon-3 robot when responding to IED incidents. (photo by A1C Nathan Doza)

National Strategy requirements and our core EOD mission areas: aircraft launch and recovery; force protection; weapons of mass destruction; nuclear weapons incidents/accidents; unexploded ordnance recovery; active range clearance; mortuary support; military support to civil authorities; and base populace training. Based on the IPT's recommendations, the Civil Engineer Readiness Council approved the redistribution of EOD manpower into four standard flight sizes: a large range flight of 60 personnel; a large force projection flight of 24 personnel; a small force projection flight of 17 personnel; and two Korean defense flights of 12 personnel each. This redistribution will occur between FY08–10 and include the establishment of 159 new EOD enlisted positions. The post-Program Budget Decision 720 military enlisted EOD strength will be 1,287 (1,128 + 159 plus-ups). The Air Force civil engineering community will also grow three new EOD flights, at Wright Patterson, Offutt, and Tinker AFBs.

These initiatives ensure a minimum sustainable manpower at home station: 10 for our large and small force projection flights, and 20 at our large range flights. This equates to each flight having two 3-person teams, two operations NCOs, and two Survival Recovery Center personnel. The range flights will have 10 additional personnel for critical range support and test missions. The IPT determined a 10-member minimum will also allow flights to provide critical mentoring of our junior enlisted force and maintain required training proficiency. We're pushing for the growth of 22 new EOD-qualified officer positions, which will provide the C2 capability to have "Airmen leading Airmen" during joint operations and provide additional EOD expertise into the major commands and Air Staff.

I am extremely proud of our EOD Airmen and recognize the sacrifices each one of them and their families make on a daily basis. Whether at home station providing force-protection response, clearing ranges, or protecting our commander-in-chief, or deploying and putting their lives on the line to protect their comrades and ensure mission success, these CE warriors sacrifice to ensure the safety and liberty of all.

Editor's note: Please see the story "EOD Memorial Honors Fallen" on page 36.

EOD Counter-IED Training: Grab the GATOR by the Tail

SMSgt Mike Hague
HQ AFCESA/CEXD

The 1/101 Brigade Combat Team Operations Center receives an urgent call from a mounted combat patrol, Rough Rider element, in the city of Kirkuk, requesting immediate Explosive Ordnance Disposal team response. The BCT Operations Center relays to the EOD team that, during the course of a coalition presence patrol in downtown Kirkuk, a convoy of five up-armored Humvees was struck by an improvised explosive device; the lead vehicle took the force of the blast, resulting in minor injuries to the occupants and minimal vehicle damage. BCT Operations Center immediately dispatches its on-call Quick Reaction Force to escort the EOD team to the incident scene. Once at the scene, the on-site convoy commander provides the EOD team chief with a detailed description of the events that led to the attack and a sketch of the scene. The EOD team chief ensures that 360-degree site security is in place and that all coalition and local national personnel in the area are safely evacuated. The EOD team uses robotic equipment to quickly do a remote survey of the vehicle damage, explosion site, and surrounding area. They find an animal carcass with electrical wires coming out of it, obviously emplaced by insurgents as a secondary IED meant to kill or injure the first-responders. The EOD team quickly destroys the secondary IED by placing an explosive charge on the carcass using the robot. The site is cleared and the EOD team is escorted back to the forward operating base—another mission success.

This realistic scenario is just one of many that Air Force EOD teams encounter during a GATOR—Global Anti-Terrorism and Operational Readiness—course. The two-week course, held at Redstone Arsenal in Alabama, is required pre-deployment training for EOD forces. It provides them training on IED threats and unique EOD procedures and equipment encountered in Iraq and Afghanistan.

"This is the only opportunity for some of us to use the tools and robots that we will be operating in theater," said SSgt John Hoover, an EOD Craftsman with the 7th Civil Engineer Squadron, Dyess AFB, Texas, who recently completed the GATOR course. "Now we don't have to spend that time learning in Afghanistan or Iraq and can use that time to focus on the mission and learning our area of operations."

GATOR is owned and operated by the U.S Army, which established the course in 2003 to enhance the training its EOD forces received before deploying in Operations Enduring Freedom and Iraqi Freedom. The Army conducts over 30 GATOR classes per year, training well over 500 joint-service EOD technicians. The permanent GATOR staff consists of four active duty Army EOD instructors and a team of contract support personnel who build IED training aids and maintain specialized robotics and equipment. Each service provides additional subject matter experts to assist the GATOR staff while their service teams attend the course.

(left) Flames engulf this EOD robot following an IED detonation. EOD robots have proven invaluable on the battlefield. (right) During GATOR training, an EOD journeyman employs a robot to investigate a suspicious device. (U.S. Air Force photos)

A team member watches in the mirror of the new EOD Cougar Armored Response Vehicle as another EOD journeyman prepares explosive charges. (U.S. Air Force photo)

GATOR's joint-service training venue allows Air Force EOD teams to train as they will fight on the joint-service battlefield. Week one consists of classroom training on current enemy tactics, techniques, and procedures, IED trends, advanced IED electronics, electronic countermeasures, Iraq/Afghanistan ordnance identification, crime scene investigation/forensic analysis, and robotic equipment operations. During week two, students respond to over 30 practical scenarios based on current EOD incidents and evolving insurgent tactics, techniques, and procedures.

"We ran problems in training similar to real world IEDs that my teams and I saw in Baghdad less than 6 months ago," said Capt Landon Phillips, a recent GATOR course attendee from the 60th CES, Travis AFB, Calif. "This course adapts and grows with changes in the bombers' techniques and tactics. In the fight against IEDs, what we knew a year ago is already obsolete. We need a course that is constantly changing and keeps us one step ahead of the bad guys—and this is that course."

"This course is a great opportunity for our young EOD troops to get a chance to get hands-on experience with robots that are being used in theater. They get a feel for what it's like to operate out of a [Joint Explosive Ordnance Disposal Rapid Response Vehicle] and work as a team just like they will be doing when they deploy," said TSgt Doug Jones, from the 62nd CES/CED, McChord AFB, Wash.

The GATOR course is just a part of the required training EOD forces must have before heading to the Iraq and Afghanistan areas of operations. They must also complete Air Force pre-deployment training at home station and a 15-day basic Combat Skills Training Course at one of the Army's stateside Power Projection Platforms. This is all in addition to their normal schedule at home station. EOD forces spend more than 30% of their time in training—to maintain their minimum career field qualifications, to hone their wartime skills, and to stay proficient on specialized EOD tools, tactics and procedures.

It's a lot of training, but the execution of EOD operations on the Iraqi and Afghani battlefields requires unwavering skill to ensure the safety and survival of coalition forces and local nationals. The GATOR course has been lauded as the "best training received to date" because it provides exceptional hands-on classroom training and challenging practical scenarios built from actual EOD operations occurring in-theater within the past 90 days.

"GATOR is the most practical training I've ever experienced in my entire EOD career," said SSgt Micah Jobe, an EOD Craftsman with the 28th CES, Ellsworth AFB, S.D.

SMSgt Hague is the Air Force EOD Operations and Training Program Manager, HQ AFCESA, Tyndall AFB, Fla.

AFCEE in Transformation

Mr. Paul Parker
HQ AFCEE/CC

As part of Air Force civil engineering's Tranformation plan, previously outlined by Maj Gen Eulberg in this magazine [ed. note: Vol. 15, No. 1], the Air Force Center for Engineering and the Environment is assuming the role of manager of the Air Force's capital investment programs, namely the environmental restoration, military construction, and family housing programs.

Along with many others in civil engineering, I had long opposed centralization, believing that you give commanders in the field the resources they need to make the decisions that affect the Air Force mission. But now, because of the looming changes in the Air Force, we have made a 180-degree turn and we're committed to successfully managing this centralization.

AFCEE will gain about 130 people as the work that used to be done at the major commands shifts here. We are now in the process of creating two program management offices, or PMOs, to oversee environmental restoration and military and family housing construction.

Environmental Restoration

The Environmental Restoration Account PMO, headed by Mr. Dale Clark, will focus on the Air Force's environmental remediation efforts, providing everything from contract award to complete management of remediation systems. The office will work in concert with installations to determine and develop restoration strategies and select agents to execute the clean-up programs; the office will also compile goal-related metrics and reports for the Air Staff.

The Center will respect relationships the bases may have with other agencies, such as the Army Corps of Engineers and the Naval Facilities Engineering Command, if those relationships are working. Funds for ERA projects will come through AFCEE and then go out to the execution agent. The awarding of contracts and task orders will be done by the execution agency, whether it's AFCEE, the Corps, or others. The major commands and bases will continue to have an important role in the restoration program, ensuring that the remediation work meets their requirements and agrees with their base master plans.

AFCEE is responsible for awarding and overseeing contracts for military housing projects, such as this one at Elmendorf AFB (below; U.S. Air Force photo*); MILCON, such as the fillstand project at Laughlin AFB (opposite;* photo by Mr. Gil Dominguez*); and environmental restoration.*

MILCON

The other new organization is the MILCON PMO, currently headed by Mr. Stephen Escude, which will manage the Air Force's capital improvement programs, including military construction and housing. Having one Air Force program will be more efficient than having separate ones for each major command. Centralized management will also make it easier to move funds between projects if needed.

The major commands and bases will still program, prioritize, and advocate for their projects and submit them for funding as they always have, but now, after a project receives appropriation by Congress, the Air Staff will work directly with AFCEE to issue design instructions and get the project moving. AFCEE will keep the major commands and bases informed on the status of the project, making sure there is visibility at all levels.

The PMO will oversee the work done by the Corps or NAVFAC and will continue to be the executive agent for approximately 10% of Air Force military construction. To assist in the oversight and management of these programs, AFCEE will create three regional management offices: Ramstein AB, Germany; Hickam AFB, Hawaii; and Brooks City-Base, Texas.

AFCEE's Built Infrastructure Division, headed by Mr. Gene Mesick, will provide technical "reach-back" support for the MILCON PMO and guidance for the design and construction process. Emphasis will be on process improvement, practical assistance to program managers, and training tools. The focus will be on moving more toward private sector models in the way we do business, with the goal of building high-quality facilities in shorter timeframes.

Whatever organizational structure we ultimately put in place has to be flexible enough to allow us to make course corrections as we go along. Putting it in "Parker's terms," as we become more "process-centric," we have to try to find a way to put consistency, discipline, responsiveness, and accountability in everything we do. Our main challenge will be to continue our accountability to the people we serve every day.

I think that for most of us at AFCEE and in civil engineering organizations around the world, the choice is clear. As we have done in the past, we will lean forward in the saddle, we will set the example for the rest of the Air Force, and we will provide an unprecedented response.

Mr. Parker is the director of the Air Force Center for Engineering and the Environment, Brooks City-Base, Texas.

Current Trends in AFIT Continuing Education

Col Barry S. Mines, Ph.D., P.E.
AFIT/CE

During fiscal year 2006, the Air Force Institute of Technology's Civil Engineer and Services School, located at Wright-Patterson AFB, Ohio, continued to provide a variety of courses in varied formats to meet the continuing education needs of both the civil engineer and the services career fields.

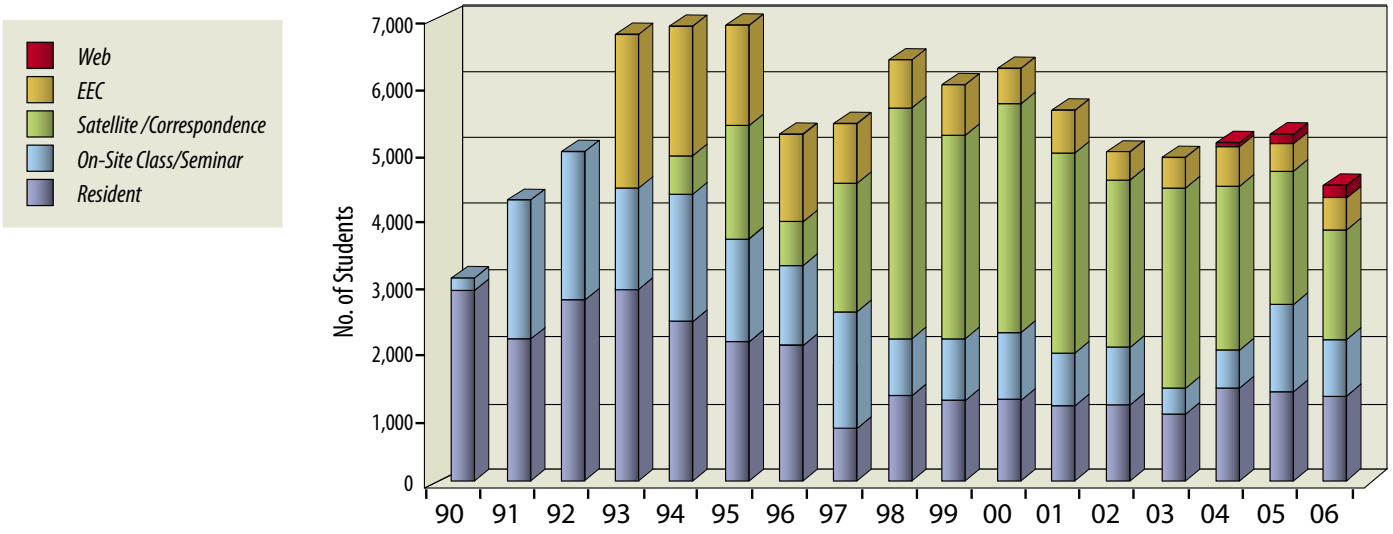
CESS courses are offered in several formats, with structure and delivery methods based on the topic and audience. Courses may be presented as traditional classroom instruction, as seminars, or as computer-based instruction. Students may either be residents or non-residents, depending on the type of class.

In fiscal year 2006, slightly more than 4,500 students completed resident and non-resident AFIT CESS courses. This number represents a significant decrease, due primarily to the reduction in the number of students taking CESS satellite courses because of the Global War on Terror and the high operations tempo. CESS resident classes have remained at comparable levels since fiscal year 1998 (see graph). The seminar program enrollment varies greatly by year. Many seminars are funded by individual units that pay travel expenses for CESS instructors to come to them—often a very cost-effective method of delivery.

In fiscal year 2005 and fiscal year 2006, more than 100 students each year took distance-learning courses. Some courses are self-paced DVDs, such as WMGT 438 – Logistics Management, which allows students to view lectures at their home base over a three-week period. Some Web-based classes, such as WENG 571 – Electrical Power Systems Design, or WENG 520 – Comprehensive Planning Development, include an in-residence portion at AFIT for a capstone project that integrates the computer instruction.

The CESS educational mission begins with initial skills training for new active duty lieutenants entering the civil engineer career field. In fiscal year 2005 and fiscal year 2006, new lieutenants obtaining their initial skills badge through MGT 101 – Introduction to Base Civil Engineer Organization, numbered 159 and 130, respectively; 66 civilians also completed the course in these

(below) The graph shows the number of students served by the Civil Engineer and Services School every year. The graph breaks out the throughput by residence, onsite, satellite, Environmental Education Center, and Web-based programs. (below right) The Civil Engineer and Services School.
(photo by Mr. William Hancock)



two years. To date in fiscal year 2007, 43 lieutenants and 34 civilians have attended; approximately 90-100 lieutenants are anticipated to attend by year's end. There has been a slight—but expected—decrease in CE career field accessions because of overall AF manning reductions.

Course Developments and Updates

In December 2006, a DVD course, ENV 175 – Environmental Management in Deployed Locations, was made available to help fulfill a new training requirement in AFI 10-210, Prime Base Engineer Emergency Force Program. In February 2006, another DVD course, "Construction Site Stormwater Management," was delivered to all CE squadrons to highlight construction site permitting and compliance requirements. The course was developed with input from AF/A7CV to address the high percentage of notices of violation (>50% of notices) that the Air Force had received in the stormwater management area.

In February 2007 at Scott AFB, Ill., one of our instructors offered a new seminar, "Environmental Management System" to Air Mobility Command base-level EMS managers. The course is tentatively scheduled to be presented at Tyndall AFB, Fla., in June to Air Education and Training Command EMS managers. This three-and-a-half day seminar was developed to help Air Force installations implement an EMS, which is required by Executive Order 13148, Greening the Government through Leadership in Environmental Management. Continuing education credits will eventually become available to course attendees.

Several CESS instructors presented lectures at the March 2007 Environmental Safety and Occupational Health Symposium in Pittsburgh, Pa. This symposium consolidates like annual ESOH training requirements across the Air Force at one location. Various Air Force major command environmental offices have representatives on the symposium planning team.

The school has recently added a former contracting squadron commander to the staff to instruct MGT 421 – Contracting for Civil Engineers, and WENV 418 – Environmental Contracting.

WMGT 570 – Civil Engineer Superintendent, continues to receive outstanding reviews. A requirement for award of a nine-level badge, this course is tailored for Senior Master Sergeant–selects to educate them on financial management, personnel assignments, and organizational leadership. It exposes students to the capabilities of our field operating agencies (the Air Force Civil Engineer Support Agency and the Air Force Center for Engineering and the Environment) and gives them the opportunity to hear directly from the career field's senior enlisted member, currently CMSgt Wayne Quattrone. In fiscal year 2006, 114 active duty and 21 Reserve and Guard SNCOs completed the course.

Our Environmental Education Center continues to fund specialized envi-

ronmental training not offered by any other Department of Defense agency. In Fiscal year 2006, the EEC funded 465 personnel to attend training. Information on the specific policies and the application procedures is available on the CESS Web site or you can call the EEC at DSN 785-5654, ext. 3714 (commercial 937-255-5654, ext. 3714). The EEC will only fund courses where a significant amount of the course content is environmental education–related; personnel applying should have environmental management, supervisory, or oversight responsibilities.

The school continues to support the GWOT; CESS instructors currently serve in both Afghanistan and Iraq and more will follow. Although this poses challenges in course scheduling and delivery, it allows our instructors to use their recent deployment experience in their course presentations. Personnel changes are ongoing. Col Jared Astin, Dean, and Dr. Dick Fenno, Associate Dean, recently retired. During the summer of 2007, there will be a high turnover in military instructors due to voluntary separations and permanent-change-of-station moves. Some course offerings in FY08 may be rescheduled until instructors arrive and are prepared to teach.

We anticipate some changes to our curriculum as we implement the A7 transformation, which includes a new Programs Flight and a new Asset Management Flight. Curriculum changes are worked through education working groups to allow base and MAJCOM experts to make recommendations on course content. Continuing education courses for the CE career field compete for funding against all other career field education requirements. Air Force Education Requirements Board funding continues to decrease, thus reducing the number of courses we offer and the number of students who can attend in residence.

The Civil Engineer and Services School has provided critical professional continuing education to Air Force civil engineer, services, and environmental professionals since 1947, the year the Air Force became a separate service. The school stands ready to meet the current and future educational needs of today's Air Force professionals, both military and civilian. For further information regarding course offerings, please consult the CESS Web site: http://www.afit.edu/cess/

Col Mines is the dean of the CESS at AFIT, Wright-Patterson AFB, Ohio.

Deployed AFIT faculty oversaw the construction of this new Iraqi border fort to replace the destroyed security facility in the background. The faculty deployed as "in-lieu-of" forces to provide design and construction management support to the Army. (photo by Maj (ret) Dean Vinson)

A GEM of an Opportunity

AFIT offers civil engineers Graduate Engineering Management program

Lt Col Kent Halverson, Ph.D.
AFIT/ENV

Do you have your master's degree yet? If not, how do you plan to get it? Night school? On-line? Tuition assistance? If those options don't appeal to you, then you should consider the Graduate Engineering Management program offered by the Air Force Institute of Technology. Each year, the civil engineer career field offers graduate school slots to selected junior officers who then enjoy a tuition-free, 18-month assignment as an AFIT graduate student at Wright-Patterson AFB, Ohio.

For decades, the GEM program curriculum — specifically tailored to meet the needs of the civil engineer — has built an analytical foundation that directly enhances decision-making ability. The core curriculum includes statistics; operations research; management and behavior in organizations; business process improvement (a foundational AFSO21 course); system dynamics; project management; project risk analysis; strategic cost management; strategic information management; and environmental policy. Each student also selects a focus sequence that allows more in-depth coverage of a specific area. The current focus sequences are leadership and management, decision analysis, and information resource management. We will offer a new focus sequence on crisis management in August; in the next few years, we'll add sequences in infrastructure management, geographic information systems, and Lean construction management.

The GEM program has the backing of senior leaders in the civil engineer career field. CE leadership ensures that the program is properly positioned to support the career field across the spectrum of the CE mission. The GEM program curriculum is reviewed on a regular basis by a team of senior CE officers from the operational world who provide valuable feedback and make recommendations on future directions for the program.

The GEM program has been ranked as top-notch by external agencies, as well, and is the nation's only master's degree in engineering management accredited by the Accreditation Board for Engineering and Technology. The GEM program was recently reviewed by external faculty from three leading engineering management schools (University of Missouri-Rolla, George Washington University, and Old Dominion University). The reviewers were impressed and commented on the fact that although the GEM program has everything that a civilian institution engineering management program offers, it is unique in that it is specifically designed for Air Force civil engineers.

Program graduates consistently comment on the value of the relationships they establish during the year and a half of day-to-day contact with their career-field peers. The strong social networks developed by GEM students endure long after they leave AFIT. Many GEM graduates routinely call on fellow graduates for operational assistance and career or assignment advice.

Interested officers need to do two things. First, apply for academic eligibility to AFIT. This can be done at any time—there is no yearly application cycle like at civilian universities, but a current GRE score is necessary to apply. Second, indicate your preference for attending the GEM program on your T-ODP. GEM candidates are competitively selected each fall at the Working Development Team meeting from the pool of academically eligible officers. Selection is based on officer performance reports, so, as always, it is essential that you do the best you can at your current job. Interested enlisted personnel should contact their career field manager. For further information regarding the program, please consult the GEM Web site at http://www.afit.edu/en/env/Degrees.cfm.

Lt Col Halverson is an assistant professor of management and the director of the GEM Program, Graduate School of Engineering and Management, AFIT, Wright-Patterson AFB, Ohio.

Civil and Environmental Engineering at

Maj David Gwisdalla, P.E.
Capt Joel Sloan, P.E.
USAFA/DFCE

The mission of the Department of Civil and Environmental Engineering at the United States Air Force Academy is to "build and maintain nationally accredited undergraduate civil and environmental engineering programs with a clear linkage to the operational Air Force as we produce leaders of character."

The goal of the Academy curriculum is to develop well-rounded officers who can meet the unique challenges of the profession of arms. Under the direction of Col Gregory Seely, the department's 25 faculty members (approximately 75% military and 25% civilian) lead the cadets through a rigorous curriculum. In 2007, the department will proudly graduate 44 civil and eight environmental engineering majors. Twenty-eight of these graduates, along with three mechanical engineering majors, will enter the Air Force civil engineer career field (see graph). Though a majority of our program graduates attend pilot training or become civil engineers, a few pursue other engineering career fields or cross-commission into our sister military services.

Dr. Ron Meade supervises the load testing of a mechanically stabilized earth wall by Cadets Joe Goetz, Travis Cope, and Ben Wong. (photo by Ms. Meggen Burghardt)

Academics

Civil and environmental engineering majors receive a Bachelor of Science degree, graduating with a total of 147 semester hours. They must take 91 semester hours of required or "core" classes in the areas of engineering, humanities, basic science, and social science; 48 semester hours in their major; five semester hours of physical education; and a three semester-hour Academy (open) option.

The civil engineering program course sequence falls into four specialty areas — structures, environmental, geotechnical, and construction — that are required by our accrediting body, the Accreditation Board for Engineering and Technology. Though only two are required by ABET, the environmental engineering program includes three major focus areas — air, water, and solid/hazardous waste. The program also includes a brief introduction to environmental health issues.

The curriculum focuses on meeting the needs of the Air Force, particularly Air Force civil engineering. Although cadets take traditional courses found in standard university civil and environmental engineering programs, they complete a curriculum with

the U.S. Air Force Academy

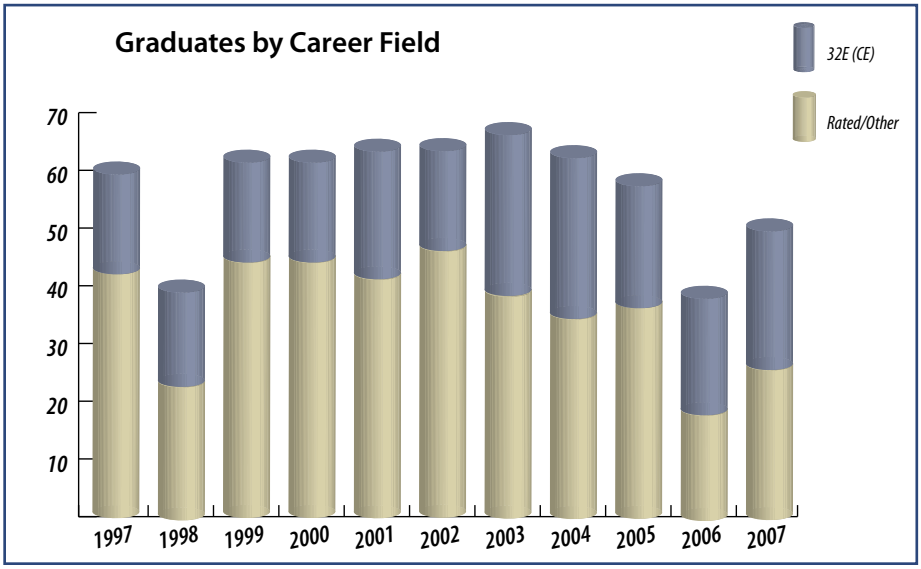
many features unique to the Air Force Academy. For example, the department's core engineering course teaches cadets how air base infrastructure and agile combat support enable the Air Force mission. Over 1,200 cadets take the course annually as a core graduation requirement.

Civil and environmental engineering majors begin their junior year by participating in a five-week summer program developed by the department. Organized into flights led by senior cadets, the juniors must complete two components of the program: the Operation Civil Engineering Air Force and the Field Engineering and Readiness Laboratory. Both programs play an integral part in shaping the department's major courses.

The OPSCEAF program allows cadets to spend two weeks as members of an operational civil engineer squadron at an active-duty Air Force base. They learn about Air Force missions, support functions, and civil engineering capabilities and gain an understanding of the roles and lifestyles of base-level civil engineer officers and non-commissioned officers. In recent years, the primary sponsors for cadets on OPSCEAF have been Pacific Air Forces and RED HORSE squadrons.

Operational experience gained from OPSCEAF is a prelude to the hands-on construction activities performed at the Field Engineering and Readiness Laboratory on the north side of the Academy. Now in its 14th year of implementation, FERL annually gives 85 to 100 Academy and ROTC cadets a broad exposure to the varied aspects of civil and environmental engineering. Under the supervision and guidance of department faculty and visiting mentors—active duty, Guard, Reserve, and civilian experts from virtually all the major commands—cadets work on 23 different activities. Cadets in the wood-frame construction activity build hogan-style homes for the Navajo Nation; last year the 22nd and 23rd homes were delivered to needy Navajo families in New Mexico. The FERL program's "construct first, design later" approach gives students a solid foundation for learning scientific theory and engineering design principles in their upcoming—and more advanced—courses.

At the end of their academic program, civil and environmental engineering majors take a capstone course entitled "Project Management and Contract Administration." The course culminates with a two-day activity, "Apprentice," in which four groups of senior students compete against each



Air Force specialty codes historically selected by graduates from the civil and environmental engineering majors at the Air Force Academy.

other as contractors to win the award of an Air Force design-build contract. The department developed the Apprentice competition based on student feedback requesting a realistic project effort open to creativity that modeled actual Air Force and industry practices. The requirement for the design-build contract is real, and an officer associated with the project introduces it to the cadets in the competition. This year Maj Donald Ohlemacher from Nellis AFB, Nev., will introduce the Predator Operation Center project at Creech AFB, Nev.

Most cadets in the civil and environmental engineering majors also take a half–semester hour Fundamentals of Engineering exam review course during the spring semester of their senior year and then take the FE exam in April. In 2006, the cadets in our two combined programs earned a 93% pass rate on the exam. This compares to national pass rates of 72% and 80% for civil and environmental engineering majors, respectfully.

Additional Opportunities

For the past three years, cadets have participated in the Associated Schools of Construction regional student construction management competition. This year's competition included students from over 32 schools in 16 states participating in a variety of categories. The Academy's team won 3rd place in the design-build category, competing against students from schools with construction management programs rather than a few construction management courses like the Academy's civil engineering major. Judges were the owner, architect, and builder of the real project.

Cadets seeking even greater challenges have the unique opportunity to perform

(top) Cadet Monica Wu presents her research poster on groundwater bioremediation. (bottom) SMSgt Gary Kleyn demonstrates the proper technique for priming and gluing PVC pipe to Cadets Kyland Freeman (far left) and Ryan Frost.
(photos by Mr. Joel Strayer)

undergraduate research with a USAFA faculty member to get a first-hand look at advanced technical and scientific problems and learn new techniques to solve them. Recent research initiatives include "Modeling and Interpreting Tandem Recirculating Wells for Groundwater Plume Containment"; "Modeling and Interpreting the Interplay Between Non-Aqueous Phase Liquid (NAPL) Dissolution and Degradation Rates"; "Baltic Sea Region Defense Environmental Cooperation Studies and Practices"; "Cis-Dichloroethene and Vinyl Chloride Attenuation in the Subsurface Environment"; and "Environmental Risks of Nanotechnology."

The department also supports the Cadet Summer Research Program, sending four or five rising seniors each year to an Air Force base to work alongside active-duty members or civilians on a research project. The program is funded by major commands and field operating agencies. In 2006, C1C Jenny Gibson was sponsored by the Air Force Center for Environmental Excellence to complete a study of "Emerging Groundwater Contaminants" at Brooks City-Base, Texas. Competing against over 180 cadets in the research program, she won the Thomas D. Moore Award, given annually for the most outstanding cadet summer research project.

The department also sponsors cadet chapters of professional organizations, such as the American Society of Civil Engineers, the Society of American Military Engineers, and the Society of Women Engineers. The cadet ASCE chapter is involved in many community projects, as well as sponsoring teams to participate in the National Concrete Canoe Contest and the National Student Steel Bridge Competition against other colleges and universities. Cadet members of the SAME student chapter participate in the annual SAME Summer Engineering and Construction Camp, held at the Academy since 2000. Each year, the camp provides 60 high school students from across the country a hands-on approach to understanding basic engineering principles.

In the fall of 2006, cadets and faculty established a SWE student chapter and have held seven "Cool Science" events at the Academy this year. Over 350 Girl Scouts attended these events, which included hands-on engineering workshops such as building and flight-testing hoop gliders, building marshmallow towers, building a water filter and testing its effectiveness, and constructing canoes.

In the fall of 2007, Civil and Environmental Engineering students will have the opportunity to take a course in protective structures. This course will address a broad range of technical issues dealing with mitigating the severe effects associated with abnormal loading incidents (e.g., blast, shock, impact), an area of study recommended by the Air Force Civil Engineer Academic Degree Committee. This course will present the latest information on designing structures to save lives—from understanding the nature of threats to analysis and design—and will provide cadets with practical information on performance and design requirements for hardened facilities.

Conclusion

The Department of Civil and Environmental Engineering at the Academy executes two successful and unique engineering programs to graduate future Air Force officers with the knowledge, skills, and responsibilities to be leaders of character for our nation. These programs are successful primarily because of the outstanding, seemingly endless support of the Air Force civil engineer community. Civil and environmental engineering majors from the Academy enjoy unique opportunities in the classroom and at our installations, with worldwide research and interaction with Airmen from all MAJCOMs. For more information on Civil and Environmental Engineering at the Air Force Academy, to apply to join the department as a faculty member, to be a FERL mentor, or to be sponsored for an advanced degree, please see the department's Web site at http://www.usafa.af.mil/df/dfce/.

Maj Gwisdalla and Capt Sloan are instructors in the Civil and Environmental Engineering Department, USAFA, Colorado.

Joint Deployment: Habbaniyah

Capt Emil Rebik
437th CES/CEX

We landed at 0200. As the CH-47s kicked out our pallets and took off, we looked around at the darkness. Barely any lights surrounded the taxiway and we felt as alone as the "WaWee" — the local version of coyotes — that howled in the heavy night air.

Our team had arrived at Camp Habbaniyah, an old British Royal Air Force base in Southwest Asia. A small joint mini-support team, our mission was to teach the Iraqi Army how to operate their base, from day-to-day operations to long-term planning.

I was one of four Air Force civil engineers on the team. As "request for forces fills" we had trained as part of a larger group — Air Force, Army, and Navy — before splitting up into the smaller teams. Teams included Air Force civil engineers, logistical readiness officers, independent duty medical technicians, and specialists in communication and services, merged with Navy logistics experts and Army personnel.

Thirty minutes after we landed, headlights appeared from a distant road; a bus picked us up and dropped us off at hard-billets. After the sun rose, we discovered that the only western-style facilities were located in the Coalition Military Assistance Training Team, or CMATT, compound, where we would stay once our transition was complete.

The previous team comprised personnel from several other theater locations and had laid the groundwork for us; we came heavier and with more AFSCs. I had three excellent Airmen to help accomplish the civil engineering portion of the task: TSgt Ron Boulanger (Structures), SrA Timothy Rentmeister (Power Pro), and A1C Francisco Garcia (Power Pro).

The base was set up to operate with two primary entities: the regional support unit and the operators. The RSU was responsible for overseeing the Iraqi Life Support Contract, established to provide water, sewer and trash collection; food and sustenance; dining facility operations; fuel; facility maintenance; and power. The operators provided "outside-the-wire" protection for the base populace and interacted with the Iraqi Police to handle base-related civilian affairs.

The RSU conducted morning staff meetings every day but Friday, a holy day for Muslims. Lead functionals from all the specialties, as well as senior enlisted advisors for the Iraqi Army and coalition forces, attended the meeting. With information from the morning meeting, the Iraqi Army base commander established orders of the day and status reports for the Ministry of Defense. Meetings were typically conducted for an hour and a half, with one serving of chai, a very sweet, hot tea. As soon as the meetings finished, our real work started.

Camp Habbaniyah had $120M of construction underway when we arrived and CMATT funded an additional $7M before we left. TSgt Boulanger initiated daily construction inspection schedules with Iraqi Army engineers, taking them out to a few construction projects each morning. He showed them how to spot material and installation defects, what variables were allowed in construction installation, and how to establish working relationships with the contractors so the occupants can get the most out of the building. Conversely, TSgt Boulanger worked with the contractors on topics such as the client's level of expectation and how to effectively plan the work (e.g., lay the electrical prior to doing the wall finishes). Afternoons were held in reserve to focus on future planning initiatives and work order plans.

SrA Rentmeister and A1C Garcia took the lead generator technician from the Iraqi Army on daily rounds to perform spot checks on

Life Support Contract personnel. Their first week on the job, both CEs noticed contractors using SAE 70 manual transmission fluid in the generators (the thicker oil was trapping heat in the cylinders, which overheated the generators, resulting in multiple power outages). In just a few days, SrA Rentmeister and A1C Garcia worked with the contractors and the Iraqi Army to establish training on generator specifications and proper maintenance operations for over 30 generators. They diligently worked with the Iraqi Army engineers to establish generator priority listings per facility and spent several late nights mentoring them on problem-solving techniques for down generators; rebuild techniques were covered during the days.

Restoring the Motor Transportation Regiment's power — out for almost three months — was one of their success stories. The CEs were able to walk the personnel from the Life Support Contract and the Iraqi Army through a partial generator rebuild, including the alternator and electrical control cards, to regain power. SrA Rentmeister and A1C Garcia also stepped out of their AFSC to learn the reverse osmosis water purification unit system. They helped the Iraqi Army track water and chemical usage, and create a water conservation plan, allowing for routine maintenance on both the generator and ROWPU systems. They also encouraged the Iraqis to conserve additional water by using brine in fire trucks and for dust-control measures.

In between Habbaniyah's day-to-day operations, we faced other challenges. We responded to suicide bombers, improvised explosive devices, and vehicle-borne explosive devices at the camp's perimeter and entry point. Bridging relationship gaps between members of different sects, between the Iraqi Army and local day workers and contractors, and even between different contractors allowed our mission to be successful. Each day at Camp Habbaniyah brought opportunities to teach and learn for all of us.

Capt Rebik is the Readiness Flight commander, 437th CES, Charleston AFB, S.C. He was executive officer/civil engineer officer-in-charge at Camp Habbaniyah, Iraq.

The author inspects a branch line with a local contractor after the water distribution system failed a pressure test. (photo by SrA Timothy Rentmeister)

Partial Exhaust Recirculation = Big Savings for Aircraft Painting Shops

Mr. Jerry Thovson
778th CES/CECM
Ms. Toni Hurley, C.I.H.
78th MDG/SGPB
Dr. Joe Wander
AFRL/MLQL
Mr. K. Quinn Hart, P.E.
HQ AFCESA/CESM

Some people are awed by the beauty and grace of a C-5 executing touch-and-go's. Others ponder how the forces of lift and gravity can be balanced to keep the aircraft's 800,000 pounds of mass aloft. Then there are the civil engineers, who wonder… How would you paint such a behemoth? What are the environmental and safety considerations? How big would the equipment need to be to provide heating and cooling for the facility? How much energy would that take?

Welcome to the world of civil engineering, where curiosity is the inspiration that constantly drives us to find better solutions.

At Robins AFB, Ga., where the Air Force provides depot-level maintenance for the C-5, CEs recently had the opportunity to ponder such questions and join in a massive rethinking of the processes and criteria that guide aircraft corrosion control facility design.

C-5 Corrosion Control Facilities

Depot maintenance for the C-5 includes corrosion control of the air frame, which requires stripping the exterior coatings and repainting the aircraft. Coatings must be applied within closely controlled temperature and humidity levels while ensuring a safe work environment by limiting contaminant levels and the build-up of explosive vapors. Emissions of environmental pollutants are also monitored and controlled. To meet these requirements, the painting bay has to have continuous movement of air across the entire surface of the plane. This serves to move overspray — a mist containing solvent vapor and particulate contaminants — away from the painter and the surface being painted. As one can imagine, ventilating a facility that can hold a C-5 would need a huge volume of air. Because the air passes through the hangar only once before being exhausted, significant energy is required to heat or cool and dehumidify it.

An end cap was added to this large-aircraft paint barn to accomodate the C-5's tail. "Cherry pickers" raise workers up to prep and coat the surfaces. In the new facility at Robins AFB, permanent manlifts will accomplish that task. The inset photo shows a closer view of the PPE described in the "Staying Safe" sidebar. (U.S. Air Force photos)

Path to Robins' CCF Redesign

Because of the large volume of air passing through the hangar and the relatively small amount of paint being applied, it was thought that some degree of air recircula-

Staying Safe

Any paint shop is a hazardous area, and an aircraft corrosion control facility is no exception. The threshold limit value, or TLV, is used to determine whether — and how much — personal protective equipment is needed. A chemical's TLV is the concentration in the air (measured as an 8-hour time-weighted average) that a worker can be exposed to during five shifts per week for 40 years without the risk of health effects.

The toxicity of chromates in primers and isocyanates in urethane topcoats used on aircraft is so great that PPE is always necessary. Workers wear a sealed protective coverall (typically made of Tyvek®), gloves, a hood that tucks into the coverall, and a supplied-air respirator. The attenuation of respiratory exposure inside this gear is typically 50. This means that a painter wearing this gear in an atmosphere that measures 50 x TLV experiences the same level of exposure as an unprotected painter exposed to the TLV.

Precision of exposure measurement is ± 10% or more, so a measured value of 50 x TLV is (50 ± 5) x TLV. A background concentration of 5 x TLV while paint is being sprayed is of the same order as the uncertainty in the measurement.

tion might be possible without adversely affecting safety and process requirements. A 1991 Department of Labor–Occupational Safety and Health Administration letter of interpretation regarding National Fire Protection Association and American National Standards Institute consensus standards quoted in 29 CFR 1910.107 (Occupational Health and Safety Standards: Spray finishing using flammable and combustible materials) established a precedent for recirculation. OSHA allows recirculation as a *de minimis* violation of 29 CFR 1910.107(d)(9) provided the recirculated facility provides "equal or better protection" to workers, which is generally interpreted to mean that no increase in the level of personal protective equipment worn by the painting crew is required. The PPE worn by the painting crew (see "Staying Safe" sidebar) increases an individual's level of protection by up to 50 times over background levels.

The potential for significant cost and energy savings justified stepping out of the box. Robins' project and construction management branch, 778th Civil Engineer Squadron, partnered with experts from the Robins 78th Medical Group's Bioenvironmental Engineering shop, and the Air Force Research Lab and the Air Force Civil Engineer Support Agency, both at Tyndall AFB, Fla., to secure approval of an 80% exhaust recirculating system for the painting hangar.

"Once we got a good look at our options, it came down to either sell the idea of recirculation or make some draconian cuts in capability," said Mr. Bill Deaver, Branch Chief, Design and Construction Management for the 778th CES. "The key to making it happen was to bring the BEE shop on board as an active partner in the campaign."

The 78th BEE recognized that recirculation should be considered a risk-benefit trade that can be modeled as part of the design and decision processes. The design team had to show that air could be recirculated into the workspace without a measurable rise in personal exposure levels. The team used a model developed by Maj Peter LaPuma at the University of Florida that estimates the equilibrium air concentration of recirculated contaminants from dimensional and process parameters entered by the user. For the Robins CCF, the risk drivers (the most toxic contaminants) are hexavalent chromium in the primers and isocyanates in the top coats. To ensure that the operating conditions would meet the OSHA criterion, Robins' team set a highly conservative design requirement that the calculated background concentration of the isocyanate component of the topcoat could not exceed the corresponding Threshold Limit Value (see "Partial Exhaust Recirculation: The Nuts and Bolts" on pg. 27).

CCFs of the Future

The result is Robins AFB's largest military construction project to date coming on line:

The interior of the overwing structural space is designed as a "duct." Air from the recirculation fans — delivered through ducts visible at the rear of the photo — flows the length of the hangar before descending into a plenum (where it is mixed with conditioned intake air) and then into the hangar. (photo by Mr. Richard Kavanaugh, U.S. Army Corps of Engineers)

an $80M, 225,000 sq. ft., state-of-the-art C-5 corrosion control facility (the first aircraft, a C-17, pulled in during April). The 778th CES chose design options "outside the box." Literally, by constructing three-story functional areas over the wings to create a channel for the T-tail and decrease the airflow cross section in the painting bay; and figuratively, by packaging real property and equipment together in the contract, so that users can step into a fully operational, single-turnkey facility.

User production was the first consideration in design. Redundancy was included to limit downtime to two scheduled one-week periods. All of the systems accommodate both large and medium-size aircraft to save time on between-job reconfiguration. A single central location will hold all of the chemicals to minimize logistical burden and exposure risk, and a tail-in configuration will ensure nose-to-tail air movement. The T-tail slot, combined with a 60 ft./min. ventilation rate, decreases the air movement from around 3 million cfm to *only* 1.2 million cfm. Central Georgia's climate requires cooling and dehumidification eight months of the year, so the 70-plus percent reduction in cooling requirements will save more than $1.5M in annual energy costs. Since almost 80% of the air can safely be recirculated, capital costs were nearly $15M less through reductions in the installed chiller capacity (from more than 10,000 tons to 2,500 tons) and associated reductions in pump sizes, pipe sizes, and coil capacities.

In the wake of this pioneering effort, another base is following suit — Elmendorf AFB, Alaska, has applied Robins' precedents to contract for two new CCFs with 80% exhaust recirculation, saving more than $5M in construction costs. Benefiting from Robins' experience, Elmendorf's team relaxed their background concentration standard to 3–5 x TLV for their designs. "The access Robins' lead gave us to recirculation as a design option allowed us to build both hangars within budget, and it will save the base a third of a million dollars annually in energy to heat and humidify painting operations," said Mr. Steve Frere, Mechanical Engineer for the 3rd CES. Mr. Shawn Moser, 3rd CES's program manager for the C-17 facility, continued, "Selling the C-17 CCF design still took a good bit of effort, but in the second hangar project PACAF actually encouraged us to recirculate the F-22 CRF."

Precedents set and lessons learned during the design and contracting processes at Robins, then generalized at Elmendorf, have made rational design of aircraft painting facilities—with the attendant energy economy and installation cost savings—available throughout the Air Force.

Authors' note: The Robins campaign that justified recirculation is documented as a precedent in an AFRL tech paper, AFRL-ML-TY-TP-2004-4518. The LaPuma model is available at http://nersp.nerdc.ufl.edu/%7Elapuma/index.html.

Mr. Thovson is a mechanical engineer at the 778th CES and Ms. Hurley is an industrial hygienist at the 78th AMDS, both at Robins AFB, Ga. Dr. Wander is a senior research scientist at AFRL, Tyndall AFB, Fla. Mr. Hart is a mechanical engineer and subject matter expert for HVAC systems at HQ AFCESA, Tyndall AFB.

Partial Exhaust Recirculation: The Nuts and Bolts

Dr. Joe Wander
AFRL/MLQL

Ventilation of a spray painting operation serves several purposes:

- **Removal of solid overspray**. Obtaining a good coating requires that the air carry the solids away from the workpiece. However, these solids are carried away as air pollutants that are not completely removed by the exhaust filters, and the fraction of paint applied that ends up in the coating decreases at high airflows.

- **Dilution of flammable vapors**. Fire safety would favor large airflows to achieve rapid dilution below the lower explosive limit, but if process heating/cooling or humidity control are applied, the operating cost is linear with airflow.

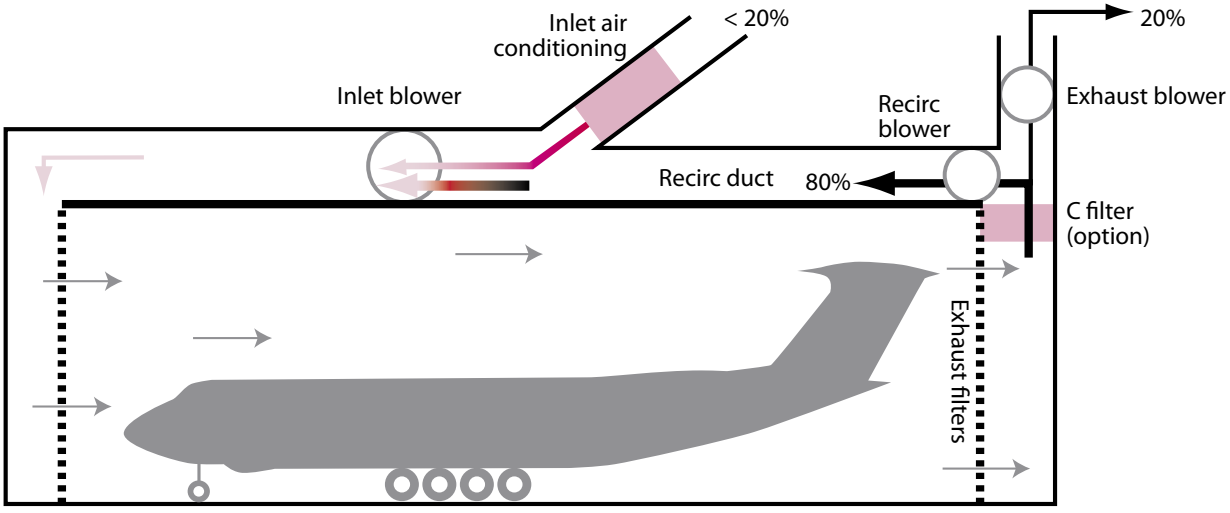
- **Worker protection**. Toxicity of coating constituents requires wearing protective gear to attenuate worker exposure, measured in units of the TLV for each component. An industrial hygienist would favor larger airflows to increase dilution, but the decrease in laydown efficiency would increase the volatile organic compound/hazardous air pollutant emission rates and the consumption rate of paint per unit area covered.

If we impose an economic driver, the strategy becomes one of minimizing both fresh air consumption and total air movement in the workspace.

Conventional ventilation systems in aircraft spray painting operations move 100% fresh air in through the work area and then exhaust it to the atmosphere. Exhaust recirculation, illustrated schematically below, changes nothing mechanical inside the work area, but introduces a return duct that carries filtered exhaust air back into the inlet plenum. The volume of air moving through the workspace to the volume of air exhausted from the facility is the recirculation ratio $\mathbf{r} = (V_{recirc} + V_{exh})/V_{exh}$. At the 80% recirculation rate used at Robins, $\mathbf{r} = (80\% + 20\%)/20\% = 5$. In the illustration, the fresh inlet air is slightly starved to promote infusion of air rather than effusion of contaminated air and (including the air that leaks in) makes up the air exhausted.

The return duct delivers contaminants into the inlet. If we define the exhaust concentration from the conventional facility while all of the paint guns are operating as C_{conv}, a simple dilution calculation shows that the concentration in the return duct approaches $C_{conv} \times \mathbf{r}$ as an upper limit during long painting sessions; in this example, the workspace background concentration rises to $0.8 \times C_{conv} \times \mathbf{r}$. If this value is $< 5 \times$ TLV for the risk-driving air contaminant—typically an isocyanate—the designer can reasonably expect that measured exposure levels in the finished hangar will be the same as in the conventional facility, allowing painters to operate using the same level of personal protective equipment.

Computational fluid dynamics (CFD) modeling is recommended as an adjunct to all new hangar designs, to ensure adequate airflow throughout the working area around the aircraft.



Fast Detection

Mr. Troy L. Stalvey
HQ AFCESA/CEXR

Two easy-to-use devices recently acquired for civil engineer Readiness flights worldwide dramatically improve their capability to detect and identify unknown substances during an emergency response so that proper protection, mitigation, and control actions can be taken.

"This is absolutely a success story for our Airmen," stated CMSgt Mike Connors, the CE Readiness Career Field Manager. "It allows us to more accurately advise the Incident Commander of relevant hazards—or the absence of hazards—in real time."

Because of a changing threat environment and national response policy, the CE Readiness career field is transforming to a capability-based expeditionary force. Both devices are commercial items and were selected as interim solutions to fill two of the most immediate equipment capability gaps discovered by a CE Readiness Transformation integrated process team.

Adjusting to Emerging Threats

Existing capabilities of CE Readiness flights to respond to chemical, biological, radiological, and nuclear threats were based upon Cold War policies, focused primarily upon war among the superpowers of the period 1945-1991. The ideology of the period emphasized the threats of overt nuclear and chemical warfare, and somewhat minimized the threat of biological warfare. Detection and identification capabilities during this time focused on known hazards; toxic industrial chemicals and toxic industrial materials or other unknown substances that might be encountered weren't included.

The end of the Cold War in the early 1990s led to a surprising level of proliferation (and limited use) of weapons of mass destruction by developing countries and terrorist organizations. As early as the 1980–1988 Iran-Iraq War, both countries engaged in chemical warfare against the other. A rash of terrorist bombings or attacks followed: the World Trade Center in 1993, the Tokyo subway in 1995, the Oklahoma City federal building in 1995, and the World Trade Center and Pentagon on September 11, 2001.

These events thrust the United States into a new era of unconventional warfare with an emphasis on multiple regional conflicts and covert terrorist actions. Enemy tactics shifted to include targeting traditionally vulnerable (and highly visible) populations and repeated attacks on the United States and its interests abroad. The anthrax attacks against multiple U.S. locations in the weeks following September 11, 2001, highlighted a vulnerability to biological attack as well as a capability gap in quickly identifying unknown substances at the local level (e.g. "white powder" incidents).

CE Readiness Transformation

The CE Readiness career field began a top-to-bottom transformation to a capability-based expeditionary force in answer to the rapidly changing threat environment and national response policy means. Short-, mid-, and long-term goals to adjust how the career field is manned, trained, equipped, and deployed were created. As part of the short-term efforts, the CE Readiness Transformation integrated process team (air staff, field operating agency, and major command subject matter experts) investigated equipment capability gaps impacting the

The HazmatID™ (below) and APD2000™ (far right), both from Smiths Detection, fill the most immediate gaps in our substance detection and identification capabilities. (photos courtesy Smiths Detection, Inc.)

ability to respond to emerging threats. Two of the most immediate gaps identified were 1) an inability to quickly detect and identify toxic industrial chemicals/toxic industrial materials, or TIC/TIMs, and other unknown liquid, solid, or vapor threats; and 2) the need to carry separate devices to detect each type of threat.

To identify available materiel solutions that met existing national standards, the IPT worked closely with existing national response agencies, including the Marine Corps Chemical and Biological Incident Response Force and National Guard Civil Support Teams, as well as DoD agencies such as the Air Force Research Laboratory, the Joint Program Executive Office for Chemical and Biological Defense, and the Edgewood Chemical and Biological Center. After soliciting feedback from current product users, two commercial items were identified as interim solutions: the HazmatID™ Portable Chemical Identifier and the APD2000™ Handheld Trace Detector, both manufactured by Smiths Detection.

The HazmatID™ Portable Chemical Identifier

The HazmatID is a portable chemical identifier used to distinguish between thousands of unknown or suspicious materials including "white powders," chemical warfare agents, TIC/TIMs, household chemicals, explosives, pharmaceuticals, and other substances. Requiring no sample preparation by the operator, the system identifies a substance or compound in seconds using infrared technology. The HazmatID on-board infrared spectrum library contains over 5,000 different materials.The briefcase-size system is highly reliable and durable, and has an intuitive touchscreen interface.

The APD2000™ Handheld Trace Detector

The APD2000 is primarily a handheld chemical agent detector that features superior resistance to interferents. The system has an ergonomic design and provides programmable visual and audio alarm settings. It is capable of detecting nerve, blister, and riot control agents using ion mobility spectrometry. It can also detect gamma radiation with an optional scintillation counter. Weighing just six pounds, this is the first detector in the CE Readiness inventory that integrates both chemical and radiological detection into a single instrument. The device can be set to automatically clear and reset following an alarm, or to function as a continuously sampling monitor.

Rapid Acquisition and Fielding

No solution works until it's in the hands of the user. The Readiness Support Directorate of Headquarters Air Force Civil Engineer Support Agency, Tyndall AFB, Fla., in coordination with the Program Element Manager for Air Force WMD funds, was able to identify $4.6M in late fiscal year 2006 that could be applied toward filling immediate capability gaps.

The acquisition process worked remarkably well, progressing from the analysis of alternatives to equipment on hand in less than 180 days. In September 2006, HQ AFCESA submitted a task order through the General Services Administration to acquire sufficient HazmatIDs and APD2000s to equip an initial 67 CE Readiness flights with this much-needed equipment. The equipment began shipping in October 2006; the last units were delivered in January 2007. This initial purchase included operator training by the vendor at each receiving location, a standard equipment warranty, and three years of reach-back support.

Plans are already underway to expand these capabilities to all CE Readiness flights with a response requirement, in addition to adding capability to our deployable kits. CE Readiness personnel are now better equipped than they've ever been, and it'll only improve from here.

Mr. Stalvey is the Emergency Management Equipment Branch Chief at HQ AFCESA, Tyndall AFB, Fla.

Lock-Out/Tag-Out: Safeguarding Keys/Saving Lives

Dr. Daryl I. Hammond, P.E.
HQ AFCESA/CESM

The terms "lock-out/tag-out" or "LOTO" are more than just a catchy phrase or acronym; they represent procedures that can prevent injury and save lives.

Accidental start-up of machines, electrical circuits that are turned on when they should be off, or gas valves that are open when they should be closed can all cause injury or death. Preventing these accidents from happening involves applying locks, danger tags, and following specific procedures—in other words, a LOTO program. A successful LOTO program includes all sorts of devices that can operate from any number of sources, including electrical, mechanical, air, or chemical.

Establishing Your LOTO Program

Every maintenance organization needs to know the basics when developing an effective LOTO program. Here are the five steps to creating one.

1. **Know Where and When to Use LOTO Devices**
   Lock-out devices isolate energy sources to prevent the unexpected startup of equipment or energizing of electrical sources. Energy sources must be locked out prior to the start of maintenance or servicing actions, unless specifically authorized by Air Force Instructions, Unified Facility Criteria, or Engineering Technical Letters.

2. **Develop Procedures**
   Procedures must be developed and documented for the safe and proper use of locks and tags on energy-isolating devices.

3. **Establish Training**
   A training plan must be developed to provide initial and recurring training on lock-out and tag-out procedures.

4. **Inspect Your Program**
   The shop supervisor shall conduct an annual inspection of the lock-out and tag-out program to ensure that the procedures and training requirements of Air Force standards are being followed.

5. **Update Checklists**
   Self-inspection and unit compliance inspection checklists must include inspections, documentation, and program requirements.

Air Force Lock-Out/Tag-Out Guidance

Used together, the following documents provide a comprehensive knowledge source for all LOTO safety issues, as well as guidance for establishing a safe working environment.

AFI 32-1064, Electrical Safe Practices
http://www.e-publishing.af.mil/pubfiles/af/32/afi32-1064/afi32-1064.pdf

AFOSH 91-501, Air Force Occupational Safety and Health Standard
http://www.e-publishing.af.mil/pubfiles/af/91/afoshstd91-501/afoshstd91-501.pdf

Unified Facilities Criteria (UFC) 3-560-01, Electrical Safety
http://www.wbdg.org

Safety requires both a positive and a safety-compliant attitude. It's not about being fast or easy, or about being inconvenienced by following procedures. It's about doing the right thing and complying with all safety guidance to keep you and your fellow workers from getting injured or killed. Be safe to stay alive.

Dr. Hammond is The Air Force Electrical Engineer. He works at HQ AFCESA, Tyndall AFB, Fla.

AFCESA

Col Richard A. Fryer, Jr.
HQ AFCESA/CC

"The more things change, the more they stay the same" is an old adage that applies to the Air Force Civil Engineer Support Agency. For more than 40 years, we have been in the support business to bases, major commands, and the Air Staff, especially in areas such as readiness, automation, and energy. Maj Gen Del Eulberg, The Air Force Civil Engineer, recently highlighted AFCESA as a key partner in these areas in civil engineering's ongoing transformation.

AFCESA continues its tradition as the focal point for readiness in support of the Air Force's top priority, "Fighting and Winning the Global War on Terror." Bringing together a strong team of engineers, firefighters, and emergency management and explosive ordnance disposal professionals, we are working some of the career field's most critical issues.

Automation has changed how we conduct our business, and AFCESA's information technology division touches all aspects of the civil engineer business through ACES and the Enterprise Environmental Safety and Occupational Health and Real Property Inventory Requirements initiatives.

The Air Force remains the federal government's largest purchaser of renewable energy. Our Facility Energy Team is leading the way as we establish the Facility Energy Center at AFCESA to build on past successes and look for new efficiencies to save vital resources.

Let us know how we can better support you. For any questions or assistance, please contact AFCESA's Reach-Back Center at 1-888-232-3721 or AFCESAreachbackcenter@tyndall.af.mil.

AFCEE

Mr. Paul Parker
HQ AFCEE/CC

The late management guru, Peter Drucker, wrote that some people believe change — like death and taxes — should be postponed as long as possible, with no change being preferable. "But in a period of upheaval, such as the one we are living in," he wrote, "change is the norm."

"Upheaval" barely describes the world scene today, with the war in Iraq, the overall struggle against global terrorism, the continuing conflict between Israel and its Arab neighbors, the double threat of a nuclear Iran and North Korea, and a major shift in the political scene in the United States.

Change is certainly the norm for the Air Force as the service undergoes what The Air Force Civil Engineer, Maj Gen Del Eulberg, has called "an unprecedented level of change at an unprecedented rate."

Transformation for AFCEE means greater responsibilities as the Air Force's military construction, environmental restoration and housing privatization programs are centralized here. The article on p. 14 provides more details.

AFCEE now has a new name, one that we feel better reflects the agency's true mission, which from the beginning has been more than environmental. Although the initials remain the same — we wanted to keep the "brand name" — AFCEE now stands for the Air Force Center for Engineering and the Environment instead of the Air Force Center for Environmental Excellence.

Despite the name change, our quest for excellence in our support of the Air Force mission is rock solid — and that will never change.

First Standard Position Descriptions Signed for NSPS

Ms. Kathy Renz
ACC/A7D
Ms. Christine Ayers
AFMA/MAHL

With an official signing on Jan. 25, 2007, the civil engineer career field became the first Air Force career field to develop standard position descriptions for their civilian employees converting to the new National Security Personnel System. Civil engineering volunteered to take the lead for this colossal effort. CE is one of the largest users of the general schedule system and wanted to standardize the classification of job series across the entire career field and minimize local inconsistencies.

The CE Functional Advisory Council, chaired by Ms. Kathleen Ferguson, the Deputy Air Force Civil Engineer, engaged early in the transformation process and was heavily involved throughout its implementation phases.

In preparation for the new system, the council established an NSPS Transformation Panel, lead by Mr. Dennis Firman, chief of the Design and Construction Division, Headquarters Air Combat Command, Langley AFB, Va. Mr. Firman organized a team of representatives from throughout the Air Force CE community to develop the SPDs. The team partnered with staff members who manage the Air Force Standard Core Personnel Document Library to develop not only the first set of documents for the CE career field but also the SPD that will be used as a benchmark for the Air Force.

The Air Force's goal under NSPS is to develop generic position descriptions to reduce the number of documents required. CE met this goal by drastically reducing the number of SPDs required (less than 200) for more than 3,900 non-bargaining civilians who converted to NSPS. Many of these documents will also apply to bargaining positions when they convert to NSPS at a later date.

The SPDs are available for use and are posted on the Air Force's Standard Core Personnel Document Library Web site: http://ask.afpc.randolph.af.mil/main_content.asp?prods3=351&prods2=328&prods1=99 .

Ms. Renz is an NSPS analyst, HQ ACC, Langley AFB, Va. Ms. Ayers is the SCPD Library Manager, Air Force Manpower Agency, Randolph AFB, Texas.

Mr. Dennis Firman, Chief of the Design and Construction Division at HQ ACC, Langley AFB, Va., signs the first SPDs for the NSPS during a small ceremony Jan. 25, 2007, at AFMA, Randolph AFB, Texas. Mr. Firman, along with Ms. Christine Ayers (left) and Ms. Abigail Hayden of AFMA's Air Force SCPD Library, signed the documents on behalf of the Civil Engineer Functional Advisory Council. Team members on the project were Ms. Stephanie Binggeli, Ms. Susan Bushman, Mr. Stephen Carter, Mr. Phil Gibson, Mr. George Hall, Ms. Christine O'Brien, Ms. Brenda Putnam, Ms. Kathy Renz, Mr. Robert Rushing, and Ms. Sheila Schwartz.
(U.S. Air Force photo)

EOD Airmen Receive Medals

2Lt Kelly George
314th AW/PA

Two explosive ordnance disposal Airmen from the 314th Civil Engineer Squadron, Little Rock AFB, Ark., received combat medals for their actions in support of Operation Iraqi Freedom in a ceremony on January 30, 2007.

SSgt Lawrence Lipinski was awarded the Bronze Star and SSgt Matthew Patnaude received his second Purple Heart for actions while deployed with the Army's 101st Airborne Division at Kirkuk AB, Iraq.

"They define the wingman concept, meeting the objective under the worst of circumstances," said Brig Gen Kip L. Self, 314th AW commander, who presented the Airmen with their respective medals.

Bronze Star recipient SSgt Lipinski disarmed more than 60 improvised explosive devices on 170 combat missions on his deployment to Kirkuk AB. This was his first deployment to Iraq.

On one of SSgt Lipinski's missions, his team's vehicle suffered a direct hit by a roadside bomb. "Being blown up is like being caught in a large wave in the ocean," said the native of Rochester Hills, Mich. "You have no control of your body. When it's all done, you hope everything is still attached."

SSgt Lipinski said he is proud of the job he did saving lives and keeping the highways of Iraq safe for U.S. convoys. "If convoys can't get past an IED, they can't get supplies [to] bases or go train Iraqis," he said. "So freeing the routes of roadside bombs is integral to our mission there."

SSgt Patnaude has deployed three times, and been injured twice. He sustained hearing damage from an improvised explosive device during his second deployment. On his third deployment, which began in July 2006, he was shot by a sniper on December 27 — the day after his 24th birthday — while defusing a roadside bomb on a main supply route outside Kirkuk AB. He was medically evacuated to Balad Surgical Hospital, Iraq.

SSgt Patnaude was awarded the Purple Heart the same day by Lt Gen Gary L. North, commander of Ninth Air Force and U.S. Central Command Air Forces. SSgt Patnaude was later flown to Landstuhl Regional Medical Center, Germany, and then to Walter Reed Army Medical Center in Washington, D.C. His family traveled from their hometown of Palmyra, N.Y., to visit.

"I'd rather be out there than sitting at home any day of the week," SSgt Patnaude said. "I love my job."

Although his parents are concerned for his safety, SSgt Patnaude said that his dad "realizes it's part of the job. He supports me."

Both Airmen are performing limited duties while they recover.

For their actions while deployed with the Army's 101st Airborne Div., SSgt Lawrence Lipinksi (L) received a Bronze Star and SSgt Matthew Patnaude received his second Purple Heart. (photo by A1C Steele Britton)

EOD Memorial Honors Fallen

Capt Chrissy Cuttita
HQ AFCESA/PA

In a public ceremony on April 21, the names of six fallen Airmen became part of the newest addition to the Explosive Ordnance Disposal Memorial at Eglin AFB's Kauffman Annex.

"It's an honor to be here and pay our respect to fallen warriors and families who gave so much," said Maj Gen Del Eulberg, The Air Force Civil Engineer, Headquarters U.S. Air Force. "Their legacy will not be forgotten."

Fourteen EOD specialists from all services — including the six Airmen — who were killed in action since January 2006 had their names added to the list of 196 men and women whose names are etched on the memorial's bronze tablets, organized by branch of service. The last time an Airman was added was 1994.

Just as they do every year, the community gathered to hear the names of heroes past and watch service members in formal uniforms place the new names with military honor. A wreath was placed and families were presented folded American flags that once flew over the schoolhouse. An honor guard fired a 21-gun salute and a bugle sounded off Taps.

CMSgt Robert Inman and Maj Eric Bollinger salute the Explosive Ordnance Disposal Memorial after the names of six Airmen were placed on the bronze tablet during a somber ceremony honoring fallen EOD service members. (photo by Mr. Bruce P. Hoffman)

"It is all about our fallen comrades," said SSgt Sarah Martinez, an instructor at the Naval School Explosive Ordnance Disposal, a Department of Defense school located at Eglin AFB, Fla. and Air Force representative for the memorial. "The ceremony is bittersweet as people are reunited but losses are felt. We see old friends and honor others."

All of the fallen were graduates of the Naval School EOD, which is located directly across the street from the memorial. For 67 years, service members have earned EOD badges, and since 1970 there has been a privately sponsored memorial to commemorate heroes who died in the performance of duty.

The somber gathering highlighted three things—to honor and reflect on the lives of the fallen, to grieve and console, and to transition and carry on—according to guest speaker Rear Admiral Donald K. Bullard, who heads the Navy Expeditionary Combat Command.

"EOD is a family," said CMSgt Jeff Schley, Air Combat Command's EOD functional manager. "I personally knew two of them. We train together, fight together and mourn together. It is a rough time not just for our career field but for our nation."

Speaking about the results of the dedicated work EOD personnel give to the mission in Afghanistan and Iraq, the first commander of Combined Joint Task Force Troy, Army Col Kevin Lutz, stated that "hundreds have been saved from injury or death." He said that there is no greater event than this memorial to honor the service and sacrifice of those military members, especially those who made the ultimate sacrifice.

Fourteen who gave their lives to keep America free could not be present at the ceremony. The memorial ensures that they will not be forgotten.

The six Airmen added to the memorial this year were Capt Kermit O. Evans; MSgt Brad A. Clemmons; TSgt Walter M. Moss; TSgt Timothy R. Weiner; SrA Elizabeth A. Loncki; and SrA Daniel B. Miller.

CE Chosen for "Why We Serve"

compiled from news service stories

Every quarter, the "Why We Serve" tour allows men and women from each branch of the military to travel all across the United States and share stories of their military experience with other Americans. Joining this quarter's tour is TSgt Robert Jubie, a structural craftsman from the 75th Civil Engineer Squadron, Hill AFB, Utah.

Initially the idea of Marine General Peter Pace, chairman of the Joint Chiefs of Staff, the "Why We Serve" program began last fall. Each quarter, eight military members — two from each service — are selected to participate, said Air Force Maj Ann N. Biggers, the program's director.

"We're sending the best of the best from each of the services," Maj Biggers said.

TSgt Jubie, who recently came home from a tour in Afghanistan, said he is honored to be chosen to participate in the tour. "I actually can't even believe it," he said. "To be one of only two Air Force members chosen is amazing. I think it must be for a reason; I feel like it's my calling."

While in Afghanistan, TSgt Jubie was assigned to a provisional reconstruction team whose mission was to rebuild government buildings and schools, and give aid and humanitarian assistance to the people of Afghanistan.

"It was a very rewarding experience, but it was also dangerous," said TSgt Jubie. "We lost 10 percent of our unit and we went through a lot mentally and physically."

"We know that the American public is hungry to hear about what these young men and women have been doing," Maj Biggers said. "It's important for our speakers, as well, because they are out there serving their country, and they want to be able to tell their stories."

TSgt Jubie said he is participating in the "Why We Serve" tour because he owes it to the people in his unit who lost their lives in Afghanistan. "I feel like I owe it to the Air Force, the American public, the DoD—really to everybody—to tell the story of the people in my unit who died. They died helping impoverished people get back on their feet after years and years of war. It's my duty to tell everyone what these people died for."

Compiled from news stories by Mr. Mitch Shaw, 75th ABW/PA and Mr. Gerry J. Gilmore, American Forces Press Service.

Note: For more information on how to request a speaker, visit the Department of Defense Speakers Bureau Web site at http://whyweserve.dod.mil/ *or contact Maj Ann Biggers,* ann.biggers@osd.mil *or comm. 703-695-3845. There is no cost to the host organization.*

Reserve Airmen Build Homes, Relationships

TSgt Stephen Bailey
301st FW/PA

Twenty-two civil engineers from the 301st Fighter Wing left home to get involved in a 'labor of love' honoring some of Hawaii's most valued citizens. They returned May 12 from a two-week deployment to Oahu where they worked on homebuilding projects for the elderly and handicapped at the Helemano Plantation on the northern end of the island.

"My guys have hit the ground running," said CMSgt Ronnie Barham, 301st Civil Engineer Squadron team leader from Naval Air Station JRB Fort Worth, Texas. "They came here wanting to make a big difference because they knew the work wasn't just another construction project — it was impacting the lives of some very important people."

The chief explained that the organization spearheading the project, ORI Anuenue Hale ('Rainbow House'), is a nonprofit group that has provided relief to and promoted the general welfare of the elderly, disadvantaged, and disabled people of Oahu since 1980.

The group's newest development is the Aloha Gardens, a 40-acre project that will include a day care and wellness center for the elderly; a vocational training center; a campground area; agricultural and aquaculture operations; a country market and mini-golf area; and short-term respite care facilities.

Initially, Air Force Reserve Command civil engineers signed on to build three 5-bedroom homes and a social hall in 2006 as part of the Innovative Readiness Training initiative, which, according to officials, has agreed to continue its support. Aloha Gardens was one of the more than 100 projects across the nation selected in 2006 by the IRT.

During their two weeks of training, the 301st reservists completed the installation of a 750-foot fence; framed three cabins; installed ten 15-foot street lights; set up and converted a trailer into an office; set up a supply tool system; and dug a 40-foot trench and installed a water line for a water fill station.

Reviewing ACC's ESOHCAMP Process

The Honorable Mr. Bill Anderson, Assistant Secretary of the Air Force for Installations, Environment and Logistics, and SMSgt Yance Childs, Operations Safety Manager for Air Combat Command, Langley AFB, Va., discuss "Lock-Out/Tag-Out" issues during a recent ESOHCAMP assessment at Beale AFB, Calif. Mr. Anderson participated in the cross-functional assessment to view firsthand ACC's Lean adjustments to the ESOHCAMP process [see article in AFCE magazine, Vol. 15, No. 1]. Not just an observer, Mr Anderson grabbed protocol checklists for Ground Safety, HAZWASTE, Occupational Health, and Water Quality and pitched in.

Photo and text provided by Maj James King, HQ ACC/A7V.

Continuing Education

AFIT

Wright-Patterson AFB OH

Course No.	Title	Start Dates	End Dates
WMGT 430	Operations Flight Commander	25-Jun	29-Jun
WENG 470 (S)	Electrical Systems for Managers	09-Jul	13-Jul
WENG 571 (W)	Electrical Power Systems Design	09-Jul	31-Aug
WENV 020 (S)	ESOH Compliance Assessments	09-Jul	12-Jul
WESS 030 (W)	Industrial Stormwater Management	09-Jul	13-Jul
WMGT 427	Fire Protection Flight Commander	09-Jul	13-Jul
WENV 021	Intro. to Installation Restoration Prog.	16-Jul	20-Jul
WENV 532	Advanced Air Quality Management	16-Jul	20-Jul
WENV 541	Water Quality Management*	16-Jul	20-Jul
WENV 417	Enviro. Restoration Project Mgmt.	23-Jul	27-Jul
WMGT 424 (S)	Real Property Management	23-Jul	27-Jul
WMGT 585	Contingency Engineer Command	30-Jul	03-Aug
WENV 419	Enviro. Planning, Progr. and Budgeting	31-Jul	02-Aug
WESS 070 (S)	Hazardous Material Management	07-Aug	07-Aug
WENG 460 (S)	Mechanical Systems for Managers	13-Aug	17-Aug
WENV 160	Qualified Recycling Program Mgmt.*	20-Aug	24-Aug
WENV 220 (S)	Unit Environmental Coordinator	20-Aug	24-Aug
WENG 440 (S)	Roofing Design and Management	27-Aug	31-Aug
WENV 222	Hazardous Materials Mgmt Process	27-Aug	31-Aug
WESS 010 (W)	Hazardous Waste Accumulation	10-Sep	14-Sep
WMGT 570	CE Superintendent	10-Sep	21-Sep
WENG 571	Electrical Power Systems Design	17-Sep	21-Sep

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Resident courses are offered at Wright-Patterson AFB, Ohio. Registration begins approximately 90 days in advance. Students should register for CESS courses through the online registration process. Visit the CESS Web site at http://www.afit.edu (under Continuing Education) for satellite (S) and Web (W) classes.

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